

中国风能资源和风电场发展规划设想

WIND ENERGY RESOURCE IN CHINA AND PLANNING OF WIND FARM DEVELOPMENT

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离网型风力发电机

Off-grid wind turbine generator

单机容量 (unit capacity): 100W—10kW

年产量 (annual production): 14,000 台 (units)

累计产量 (cumulative production): 180,000 台 (units)

已经出口到印尼、越南、日本、挪威、英国等。

Exported to Indonesia, Vietnam, Japan, Norway, UK, etc.

中国风能资源的储量和分布

Potential and distribution of wind energy resource in China

中国陆地10m高度层实际可开发的风能储量为2.53亿kW。

“practical wind potential can be utilized” at 10m height in China, it has been estimated to be 253GW.

可供经济开发的风能储量有多少尚需进一步查明。

detailed survey is in urgent need to obtain the potential installed capacity which could be real utilized economically.

中国东部沿海水深在2m到15m之间的浅海海域面积辽阔，风能资源丰富，靠近主要用电负荷区域，初步估计10m高度约7.5亿kW，具有开发海上风电场的巨大潜力。

Along the coast line of east China, offshore area with water depth between 2m and 15m are huge, where wind speed is higher than onshore, the offshore wind farm sites are close to the main electricity load center, with great potential for the development of offshore wind farms, 750 GW has been preliminary estimated.

中国风能丰富的地区主要分布在西北、华北和东北的草原或戈壁，以及东部和东南沿海及岛屿。

In China areas rich in wind energy resource are mainly in grass land or gobi of northwest, north and northeast China, as well as coastal area and islands in east and southeast China.

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资源的详查

Detailed survey of wind resource

- 1996年美国国家再生能源实验室(NREL)利用新开发的计算机模型和世界各类测风数据库, 结合地理信息系统(GIS)技术, 完成了南澳岛的风能资源分布图。
- In 1996 the National Renewable Energy Laboratory (NREL) of USA, completed a wind map of Nan'ao Island in China, by using newly developed computer model and Geographic Information System (GIS) technology.

- NREL继续与中国国家电力公司合作，对江西鄱阳湖地区和福建广东沿海进行风能资源模拟，采用现有数据初步绘出风能资源图。
- the cooperation between NREL and State Power Corporation of China (SP) continued for wind mapping, in areas of Poyanghu Lake of Jiangxi province, coast of Fujian and Guangdong province. Preliminary mapping has been made.

希望能够继续得到国际组织的资助，将此项工作的范围扩大到整个沿海陆地和岛屿，包括水深在2m到15m的浅海海域，以及东北三省和内蒙东部地区。

Wind mapping are expected to be supported by international organizations, to expand the scope to all coastal areas, including onshore of main land and islands, offshore of shallow sea with water depth between 2m and 15m, as well as three provinces of northeast China and east part of Inner Mongolia.

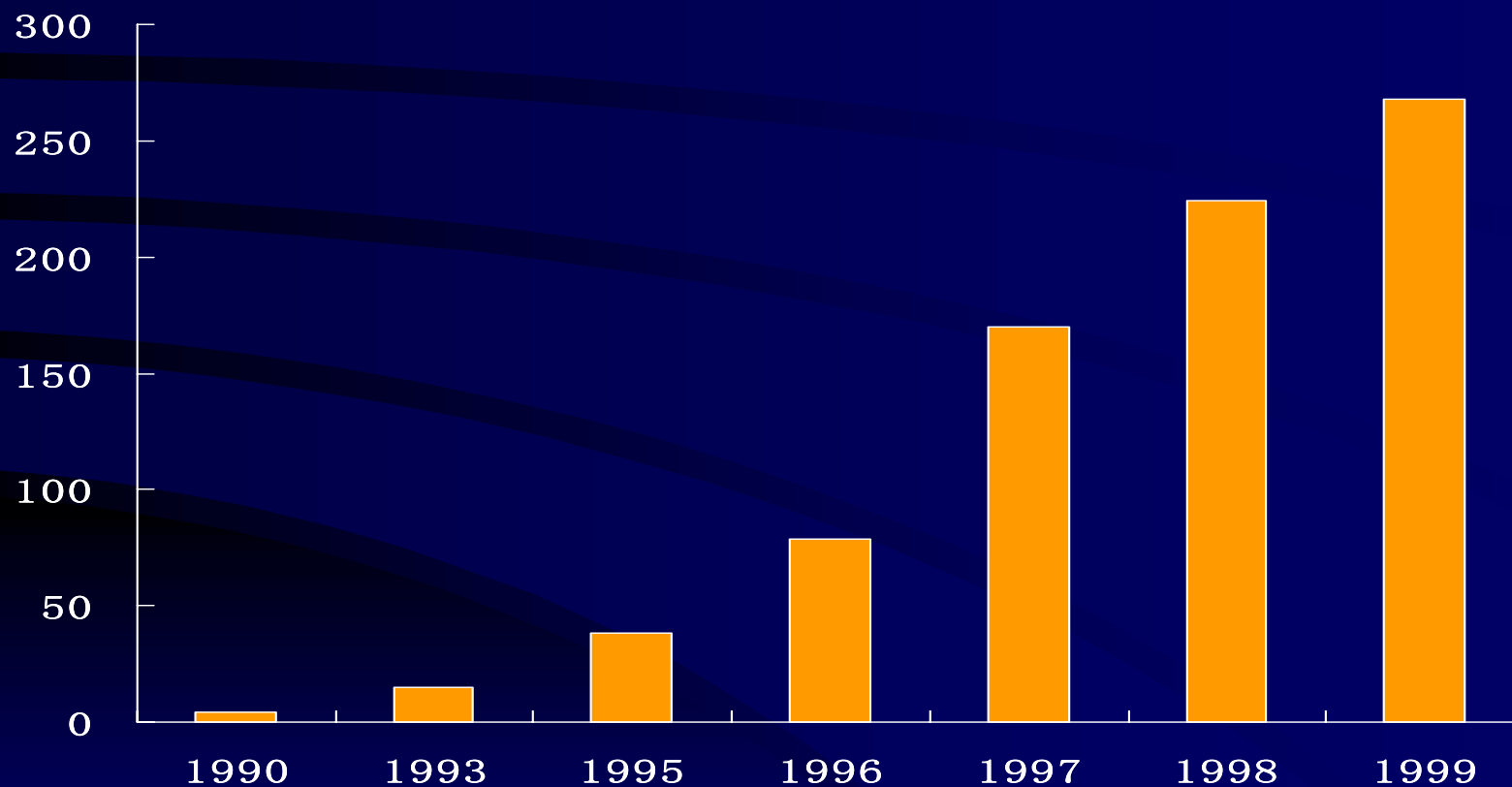
风电场发展的规划设想

Estimation of wind power development in the beginning of 21st century

风电装机容量从1994年底的2.9万kW增长到1999年底26万多kW，预计2000年底实际可达约40万kW。

The installed capacity of wind power increased from 29MW in 1994 to 260MW in 1999, it is estimated that maybe 400MW by the end of 2000.

中国风电装机容量 Installed capacity of wind power(MW)



- 可以落实资金的项目到2000年底已达96万kW，影响风电发展的因素主要不是资金短缺。只有环境保护的压力进一步加大，才能促使激励政策出台，使风电进入大规模发展的时期。
- Wind projects with available funds by the end of 2000 are 960MW, lack of funds seems not the main barrier of the wind power development. Only when the environment pressure getting higher and further more incentive policy are formulated, wind power will be developed in large scale.

优先发展风电的地方应当是风能资源好、火电排放污染比较大、经济较发达、电价承受能力强的地区，如东南沿海的浙江、福建和广东等省。

Wind power development should be taken as priority in those places with good wind resource, high emission of GHG by coal fired power plant, well developed economy and affordable to higher price of renewable energy, such like Guangdong, Fujian and Zhejiang province.

在2001年到2005年期间，应加强东北三省、内蒙东部、河北北部及整个沿海陆地岛屿的风能资源详查，找出能够建设400万kW风电场的场址。

During 2001 to 2005, detailed survey of wind energy resource should be implemented in three province of northeast China, east part of Inner Mongolia, north part of Hebei and all coast areas including islands, to find wind farm sites available to build 4000MW wind farms.

- 开始对岸外海上风能资源进行普查，找到可以建设示范海上风电场的场址。
- starting wind resource assessment on offshore shallow sea area, to find several potential sites for demonstration offshore wind farms.

按当前实施的政策预计2005年风电装机可达150万kW。

Based on the current policy it is estimated that 1500MW of wind turbines could be installed by 2005.

- 如果减排温室气体的环境保护压力加大，国家出台全社会分摊风电价差的政策，2005年装机有可能完成300万kW。
- If the pressure of environment protection on mitigation of GHG emission getting higher, and the incentive policy of sharing price difference of wind power by all users of power grid nationwide could be formulated by government or legislative, 3000MW of wind installations maybe possible by 2005.

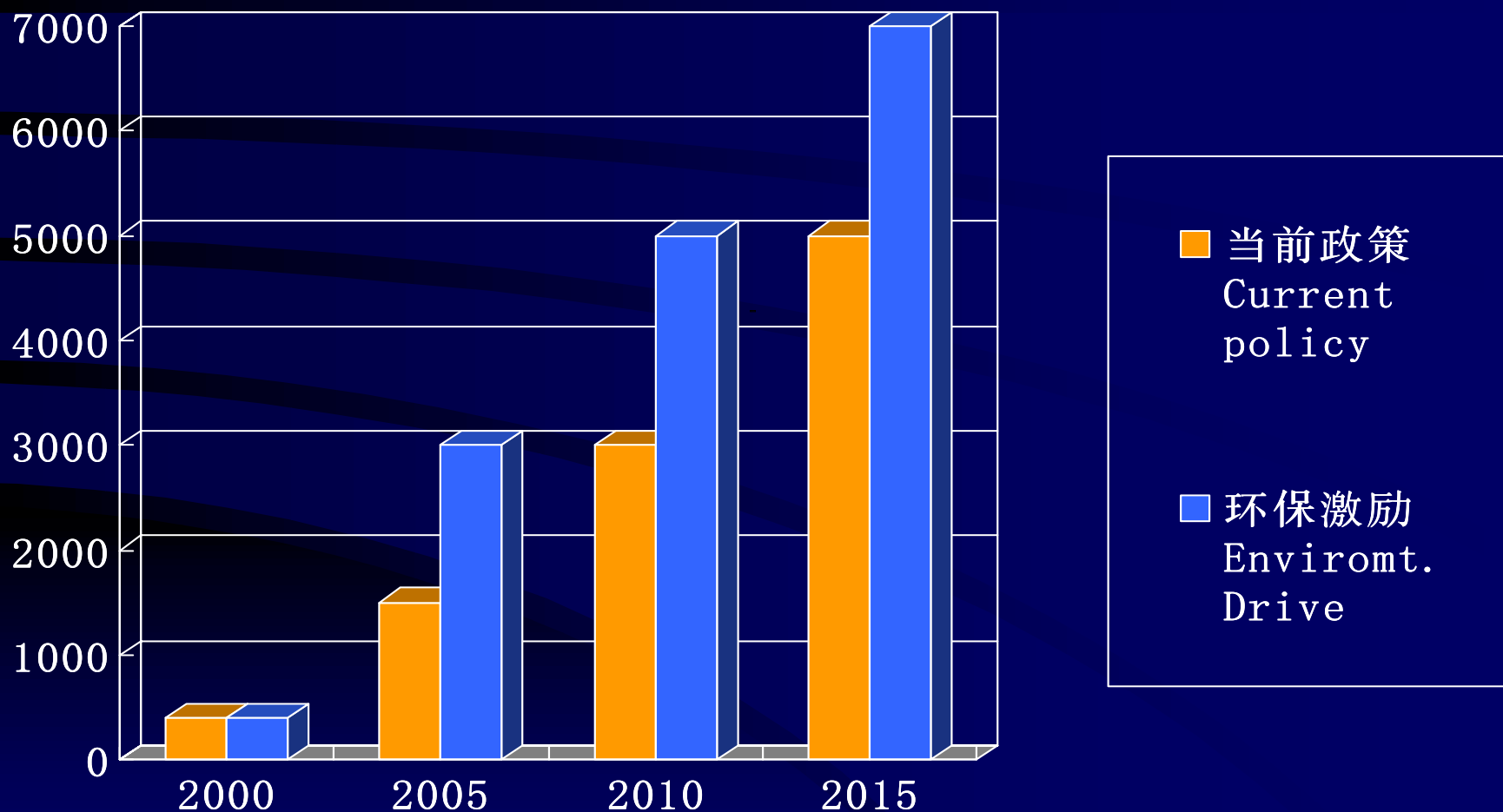
- 从2006年到2010年，国内制造的整机和零部件成本较低，在新增容量中要占70%，累积总装机约300万kW到500万kW。这期间应开始建立示范海上风电场。
- From 2006 to 2010, due to lower cost of domestic made turbines and components, among the new installed capacity 70% of turbines should be local manufactured, and cumulative to 3000MW to 5000MW. During this period a demonstration offshore wind farm should be built.

2011年到2015年，火电成本上升缩小了与风电的价差，有利于风电的商业开发，累积装机约在500万kW到700万kW，海上风电场也将进入规模发展阶段。

From 2011 to 2015, along with cost of coal fired power increase, reducing the difference to wind, beneficial to the commercial development of wind power, cumulated installed capacity will be 5000MW to 7000MW. Offshore wind farm will also get into the phase of large scale development.

风电发展规划设想

ESTIMATES OF WIND POWER DEVELOPMENT



- 风电以其良好的环境效益，逐步降低的发电成本，必将成为21世纪中国重要的电源。

- Wind power must be an important power source in China in 21st century, since it is environment friendly and lower cost.